

chondrial interactions. As the author points out, the development of new technologies within the last ten years has rendered obsolete most of the old data on these subjects, and these chapters are filled with new information of great interest. The title of this book, as compared to that of the 1973 volume, reflects the current view of the sea urchin embryo; it is now the system of choice for many cell and molecular biologists as well as developmental biologists.

Giudice is particularly well qualified to take on the enormous task of reviewing the literature of the last 12 years of research on the sea urchin embryo, for his own work covers a wide range of topics. The 67 pages of references are themselves a valuable resource. Indeed, so assiduously did the author pursue his task of bringing us up to date that even as he was correcting proofs he was also writing an addendum of 15 pages of text and six pages of references, making the coverage complete through 1984.

The editors of the volume, however, have not served the author well. Over half the pages have typographical errors, figure labels do not always correspond to figure legends (arrows, letters, or numbers are sometimes missing), and references to figures and tables are occasionally missing in the text.

Nevertheless, this book is a valuable resource for all those who work with sea urchin embryos, including the specialist who wishes to be informed of work in related areas and the graduate student who is new to the field.

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Copper Chemistry

Biological and Inorganic Copper Chemistry. KENNETH D. KARLIN and JON ZUBIETA, Eds. Adenine, Guilderland, NY, 1986. In two volumes. Vol. 1, xii, 273 pp., illus. \$65. Vol. 2, xii, 298 pp., illus. \$65. Vol. 2, xii, 298 pp., illus. \$65. Based on a conference, July 1984.

These are exciting times for copper chemists. Fired by discoveries that in living systems copper performs such diverse functions as oxygen transport, electron transfer, dismutation of superoxide ion, hydroxylation of dopamine and tyrosine, reduction of dioxygen, and oxidation of amines to aldehydes and by industrial applications ranging from hydroquinone production to catalytic carbon-carbon bond formation, bioinorganic, coordination, and organometallic chemists have focused attention on the

chemistry of this element to an unparalleled degree. In order to facilitate communication among scientists in this fast-moving area, K. D. Karlin and J. Zubieta organized conferences in 1982 and 1984 at the State University of New York at Albany. The present two-volume work houses contributions from participants in the second conference.

Volume 1 begins with 12 papers on copper proteins, in which most of the important systems are discussed, including the blue copper proteins plastocyanin and azurin, copper-zinc superoxide dismutase (SOD), cytochrome c oxidase, hemocyanin, galactose oxidase, and laccase. A highlight of this section is the spectacular 300 MHz ^1H NMR spectrum of copper(II)-cobalt(II) SOD, $\text{Cu}_2\text{Co}_2\text{SOD}$, obtained by Bertini and Luchinat, in which sharp, isotropically shifted resonances arise for ligands bound to the copper chromophore. The next section devotes four papers to medicinal aspects of copper chemistry, including a valuable survey by Crouch *et al.* of the use of copper complexes to treat (inter alia) arthritis, acute rheumatic fever, and cancer. This interesting area would benefit from incisive research at the molecular level. The volume closes with eight contributions on the physical characterization of copper complexes, including magnetic studies by Hatfield and Kahn, who direct two of the leading groups. Other papers in this section cover applications of electron spin resonance and optical spectroscopy and Hendrickson's pioneering work on electron transfer in binuclear mixed valence copper complexes.

The second volume leads off with nine papers describing the interactions of copper complexes with dioxygen, without question the highlight of the series. This work, inspired by the known biological functions of copper, reports small copper complexes that bind dioxygen reversibly (Karlin, Zubieta *et al.*), stabilize copper(II)-superoxide and -peroxide linkages (Thompson), catalytically oxidize phenol (Lyons and Hsu), and convert acetonitrile to 3,5-dimethyl-1,2,4-triazole (Nelson, Drew, *et al.*). It is astonishing that so much progress in this difficult area of chemistry has been made in only two years since the previous Albany conference. The remaining two sections of volume 2 are devoted to coordination chemistry and non-functional protein models (eight papers) and to organometallic copper complexes (three papers). The latter section includes the very nice studies of Doyle *et al.* on metal-metal bonded copper clusters and of Caulton *et al.* on polyhydrides, most notably $\text{Cu}[\text{H}_3\text{ReL}_3]_2^+$, where L is diphenylmethylphosphine.

The editorial and production work is of the generally high quality that one has come

to expect from the editors and publisher, although there are some annoying lapses. In volume 1 the paper by Bertini and Luchinat has text missing at the top of p. 25, p. 121 displays a gel electrophoresis figure that is useless owing to unlabeled lanes and a scanty caption, and p. 125 tells us that "the search for antitumor agents has been eminated [sic] by studies of organic compounds." Volume 2 reveals some unevenness in the type of material presented. In one chapter we find a table of analytical data, whereas other chapters present their subjects more superficially. On the whole, however, the papers are incisive and well written.

In summary, I recommend these volumes to all bioinorganic and coordination chemists. Anyone working with copper will find it a handy compendium of much of the important work through 1984, and students especially will profit from the overview approach taken by most of the authors. This reviewer hopes that the Albany copper conferences will be continued (there was none in 1986) and that their legacy will include further volumes such as these.

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Some Other Books of Interest

Biology of New World *Microtus*. ROBERT H. TAMARIN, Ed. American Society of Mammalogists, [no place], 1985 (available from Gordon L. Kirkland, Jr., Vertebrate Museum, Shippensburg University, Shippensburg, PA). xiv, 893 pp., illus. \$55. ASM Special Publication no. 8.

This treatise on the rodent genus *Microtus* (voles), commissioned and published by the American Society of Mammalogists, is modeled on the Society's 1968 volume *The Biology of Peromyscus*. In this case coverage has been limited to New World forms to keep the work to a manageable size. The volume consists of 21 chapters, mostly by single authors. It begins with accounts of the fossil record, taxonomy, zoogeography, macroanatomy, microanatomy, and ontogeny of the genus. Habitats, community ecology, behavior, activity rhythms and spacing, and dispersal are then reviewed. Further chapters cover parasites and predators, population dynamics, and management in the wild and in the laboratory. Finally, endocrinology, reproductive patterns, nutrition, energetics and thermoregulation, and genetics are discussed. The chapters were subjected to review prior to publication. According to the editor "there is some repetition and fragmentation, but each subject is self-con-